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10/805,338

03/22/2004

Shin-ichi Nishizono

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EXAMINER

LEE, CHUN KUAN

ART UNIT

PAPER NUMBER

2181

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/805,338

Applicant(s)

NISHIZONO ET AL.

Examiner

Chun-Kuan (Mike) Lee

Art Unit

2181

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

  
FRITZ FLEMING  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2100  
8/7/2006

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 03/22/2004.

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 21-27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 21-27 recites the limitation "wherein a use status" in each of the respective claims. There is insufficient antecedent basis for this limitation in the claim.

As per claims 21-27, it appears unclear as to which "use status" the applicant is referring to, as the claims 19-20, which claims 21-27 are depended upon directly or indirectly, does not appear to recite a claim limitation "a use status".

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 9-11, 18-20 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of Coates et al. (US Patent 6,694,389).

3. As per claims 1, 10 and 19, AAPA teach a storage apparatus and a reconnection controlling method comprising:

a physical device (Drawings, Fig. 6, ref. 2a); and

a storage controlling apparatus (Drawings, Fig. 6, ref. 3) disposed between said physical device and a host (Drawings, Fig. 6, ref. 4) to control an access from said host to said physical device (Specification, page 1, l. 22 to page 2, l. 2);

said storage controlling apparatus comprising:

one or more host interface modules (Drawings, Fig. 6, ref. 20), connected to a plurality of channels (Drawings, Fig. 6, ref. 50) of said host through a plurality of paths belonging to the same path group, for controlling an interface with said host (Specification, page 2, ll. 17-19);

a management module (Drawings, Fig. 6, ref. 20) for generally managing the whole of said storage controlling apparatus (Specification, page 2, ll. 20-21);

said management module comprising:

a reconnection queue (e.g. the cache memory in the management module) for enqueueing information (e.g. temporarily storing the data in the cache memory) on one or more input/output requests to be reconnected among input/output requests from said channels of said host as control blocks (Specification, page 3, ll. 12-20; page 4, ll. 2-8 and page 4, l. 25 to page 5, l. 6), and managing said enqueued control blocks (Drawings, Fig. 7 and Specification, page 5, ll. 22-24), wherein the management module

controls the issuing of reconnection request (Fig. 7, ref. A13), therefore manages the enqueued control blocks associated with the I/O requests; and

a controlling means, when an I/O process corresponding to one of said one or more control blocks managed in said reconnection queue is resumed, for controlling resumption of said I/O process in either

a first system of issuing a reconnection request to each of said paths belonging to the same path group one by one through said host interface module and requesting said host interface module to perform said I/O process using a path first successful in reconnection at the point of time that the reconnection succeeds (Specification, page 7, ll. 5-16), wherein the implementation of the first system would result in the lower transmission rate as the requesting is implemented one by one, or

a second system of issuing concurrently or almost concurrently the reconnection request to said plural paths belonging to the same path group through said one or more host interface modules and requesting said host interface module to perform said I/O process using a path which first succeeds in the reconnection (Specification, page 7, ll. 17-26), wherein the implementation of the second system would result in the higher transmission rate as the requesting may be implemented to more

than one host interface module, and further more, there must be the controlling mean in order to properly operate in either the first system or the second system.

AAPA does not expressly teach the storage apparatus and the reconnection controlling method comprising wherein said management module comprising:

a monitoring means for monitoring the number of said enqueued control blocks in said reconnection queue; and

a switching means for dynamically switching the system to be executed by said controlling means to either said first system or said second system according to the number of the enqueued control blocks monitored by said monitoring means.

Coates teaches a method and a apparatus for data flow control comprising:

determining the occupancy (e.g. fullness) of a buffer by counting the number of sub-buffers in a steady state of starvation and congestion (col. 11, ll. 21-32); and

determining if the fullness of the buffer is above an upper threshold (Fig. 5, ref. 500 and col. 3, ll. 36-50);

signaling the receiver to increase transmission rate if the fullness of the buffer is above said upper threshold (Fig. 5, ref. 520 and col. 3, ll. 36-50);

determining if the fullness of the buffer is below an lower threshold (Fig. 5, ref. 530 and col. 3, ll. 36-50); and

signaling the receiver to reduce transmission rate if the fullness of the buffer is below said lower threshold (Fig. 5, ref. 540 and col. 3, ll. 36-50);

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Coates's buffer flow control into AAPA's reconnection queue. The resulting combination of the references teaches the storage apparatus and the reconnection controlling method further comprising:

monitoring the fullness of the reconnection queue by counting the number of enqueued control blocks in the reconnection queue; and

switching between operating at the higher transmission rate (e.g. second system) or operating at the lower transmission rate (e.g. first system) base on the fullness of the reconnection queue.

Therefore, it would have been obvious to combine Coates with AAPA for the benefit of implementing a robust flow control ensuring the buffer does not become full (congested) or empty (starved) during transmission of data (Coates, col. 1, ll. 11-24).

4. As per claims 2, 11 and 20, AAPA and Coates teach all the limitations of claims 1, 10 and 19 as discussed above, where Coates further teaches the storage apparatus and the reconnection controlling method comprising:

wherein when said the number of the enqueued control blocks monitored by said monitoring means is not larger than a predetermined number (Fig. 5, ref. 530), said switching means switches the system to be executed by said controlling means to said first system (Fig. 5, ref. 540), and

when the number of the enqueued control blocks monitored by said monitoring means exceeds said predetermined number (Fig. 5, ref. 500), said switching means

switches the system to be executed by said controlling means to said second system (Fig. 5, ref. 520).

5. As per claims 9, 18 and 27, AAPA and Coates teach all the limitations of claims 1, 10 and 19 as discussed above, where AAPA further teaches the storage apparatus and the reconnection controlling method comprising wherein when said second system is executed, said controlling means successively requests the second and later paths which succeed in the reconnection to perform the I/O processes corresponding to one or more control blocks which can be reconnected among said control blocks managed in said reconnection queue (AAPA, Specification, page 7, l. 17 to page 9, l. 1).

6. Claims 3-8, 12-17 and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) and Coates et al. (US Patent 6,694,389), and further in view of Mizuno (US Patent 6,922,743).

AAPA and Coates teach all the limitations of claims 1, 10 and 19 as discussed above.

AAPA and Coates does not teach the storage apparatus and the reconnection controlling method further comprising:

wherein said management module further comprises a management table for managing a use status of each of said paths through said one or more host interface modules; and



when either said first system or said second system is executed, said controlling means refers to said management table to issue the reconnection request to the corresponding paths set free in said management table through said host interface module.

Mizuno teaches a system and a method comprising:

a controller (Fig. 5, ref. 530) comprising a cross-call administration table (Fig. 5, ref. 540); and

wherein the cross-call administration table provides the status of a port (e.g. ready flag) that a I/O path is connected to (Fig. 8, ref. 825, 835), and further more, the cross-call administration table is read out to determine which of the channel control processors (Fig. 5, ref. 505) controlling the ports are not busy in order to carry out the reconnection process (col. 9, ll. 13-26).

It would have been obvious to one of ordinary skill in this art, at the time of invention was made to include Mizuno's cross-call administration table and the corresponding ready flag into AAPA and Coates's management module. The resulting combination of the references teaches the storage apparatus and the reconnection controlling method further comprising:

the management module comprises the cross-call administration table with the ready flag; and

when operating in either the first system or the second system, the control mean reads out the cross-call administration table in order to determine, through the host

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interface module (e.g. channel control processors), which of the I/O path is not busy to implement the reconnection process.

Therefore, it would have been obvious to combine Mizuno with AAPA and Coates for the benefit of increasing the data throughput to the host as the response to the host's request can be made rapidly (Mizuno, col. 4, ll. 39-43).


**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chun-Kuan (Mike) Lee whose telephone number is (571) 272-0671. The examiner can normally be reached on 8AM to 5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Fritz M. Fleming can be reached on (571) 272-4145. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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07/28/2006

  
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